

STATE OF ALASKA

*William A. Egan, Governor*



Annual Report of Performance for

*INVENTORY AND CATALOGING*

*DISSEMINATION OF INFORMATION  
COLLECTED ON DOLLY VARDEN*

*INVESTIGATIONS OF PUBLIC FISHING ACCESS  
AND AQUATIC HABITAT REQUIREMENTS*

by

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## RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations  
of Alaska.

Project No.: F - 9 - 6

Study No.: G - I Study Title: INVENTORY AND CATALOGING.

Job No.: G - I - H Job Title: Inventory and Cataloging of  
Sport Fish and Sport Fish  
Waters of the Lower Susitna  
and Central Cook Inlet  
Drainages.

Period Covered: July 1, 1973 to June 30, 1974.

## ABSTRACT

Eight lakes and three streams in the western Susitna area, and 18 lakes in the Anchorage vicinity were test netted for fish population data.

Rainbow trout, Salmo gairdneri, were stocked in 14 Anchorage area lakes and one stream. Arctic grayling, Thymallus arcticus, were planted in Connors Lake.

Eulachon, Thaleichthys pacificus, spawning in Twentymile River, were three and four years of age and had a 2:1 male to female ratio. An estimated 72,950 eulachon were harvested by recreational fishermen in 1973.

Four lakes in the Anchorage area were treated with 2.5% emulsified rotenone (Pronoxfish) to eradicate populations of Alaska blackfish, Dallia pectoralis, and threespine stickleback, Gasterosteus aculeatus.

The 1973 escapement of chinook salmon, Oncorhynchus tshawytscha, into west side Susitna streams was generally improved over 1972 levels.

## RECOMMENDATIONS

1. Evaluation of fishery resources in stream waters of the Greater Anchorage Area Borough be conducted on a continuing basis. Watersheds of special importance are Campbell Creek, Ship Creek, Chester Creek, and Eagle River.
2. Investigation of spawning runs of eulachon, their biological characteristics and the sport fishery in the Turnagain Arm area be continued.
3. Investigations of waters between Tyonek on Cook Inlet and the headwaters of the Talachulitna River be intensified due to proposed timber sales, coal exploration, and gas field development, which will require environmental impact analysis from the Department of Fish and Game.

## OBJECTIVES

1. To survey existing and potential recreational fishing waters, establish and record their basic biological, physical, and chemical characteristics.
2. To assist in determining the status of public access on waters of the area and recommend selection of specific public fishing access sites.
3. To evaluate the impact of multiple water use and urban development projects on fisheries, aquatic life, and water quality of lakes and streams in the area.
4. To determine stocking measures, formulate management practices, and direct the course of future studies on area waters.
5. To investigate, evaluate, and develop plans for the enhancement of anadromous and resident fish stocks.

## TECHNIQUES USED

Fish population sampling throughout the Anchorage-Western Susitna River area was accomplished with 125 foot variable mesh gill nets, a Smith-Root Type V backpack electrofishing unit, hook and line, and dip nets.

Measurements of fish taken by the various collection methods included total length to the nearest millimeter (mm), and weight to the nearest gram (g). Additionally, notes on fish stomach contents and parasites were taken for inclusion in area files. Ages of fish were determined from impressions of scales on cellulose acetate sheets projected on the screen of a Micro Design C.O.M. 200 microfiche reader, or by examination of otoliths placed in xylol and viewed through a binocular microscope.

Water samples collected in lakes of the area with a Kemmerer water sampler were analyzed for dissolved oxygen, pH, total alkalinity, and total hardness with a Hach Al-36-WR test kit. Temperatures of water samples were measured in degrees fahrenheit (°F) by pocket thermometer, and water transparency evaluated with a 20 centimeter (cm) diameter secchi disc divided into black and white quadrants.

Shorelines of lakes for construction of morphometric maps were established by plane table and alidade surveys, or from aerial photographs whereon measurement of surface features and landmarks permitted accurate determination of their scale. Depths plotted on morphometric maps were obtained from a boat with a Lowrance LFD-300 fathometer along transects of the lake surface.

A compensating planimeter was used to trace surface and contour interval areas for morphometric map construction. Information on lake surface area (acres), volume (acre feet), and average depth (feet) were calculated in turn from the planimeter readings.

Aerial and ground surveys were utilized to observe distribution, numbers, and time of arrival of adult chinook salmon in upper Cook Inlet streams.

## FINDINGS

### Survey of Fish Populations and Environmental Characteristics of Area Waters

Lake surveys and test netting for species composition was conducted on Coal Creek, Congahbuna, Eightmile, Judd, Lockwood, Sevenmile, and Un-Named #6815, and #6694 lakes in the western Susitna area. As shown in Table 1, Judd Lake contained the most diverse fish population of the surveyed lakes. Un-Named Lake #6815 was devoid of all fish species except threespine stickleback, Gasterosteus aculeatus, which were visually observed.

Only four of the eight lakes checked in the western Susitna area were judged to have significant sport fishing potential. Lockwood Lake and Un-Named Lake #6694, which share the same drainage, and Congahbuna Lake, have substantial populations of wild rainbow trout, Salmo gairdneri. In Judd Lake, Dolly Varden char, Salvelinus malma, occur in size and abundance which would provide some attraction to the sport angler.

Sevenmile and Eightmile lakes are only a few miles apart, and their drainage areas are comparable in many respects. Longnose sucker, Catostomus castostomus, and landlocked coho salmon, Oncorhynchus kisutch, were the only fish collected in these lakes. The restricted flow of water from the lake outlets and the partial blockage due to heavy growth of aquatic vegetation may account in part for coho salmon becoming landlocked in both lakes.

Coal Creek Lake contained Dolly Varden char and rainbow trout of such small size and population numbers that it would not provide an attractive fishery for sport anglers. It did appear that this lake provided a rearing area for a substantial juvenile coho salmon population.

TABLE 1. Test Netting Results, Western Susitna Area, 1978

Lake and Location	Date	Species	Number Fish	Length (mm)		Net-Hours	Fish/ Net-Hour
				Range	Mean		
164	Coal Creek T16N, R13W S10, 11	DV	6	115-148	130	131.25	0.05
		RT	13	180-260	210	131.25	0.10
		SS	29	102-192	116	131.25	0.22
	Congahbuna T11N, R12W, S5, 4, 8, 9	LSK	43	-	-	71.25	0.60
		RT	48	122-474	254	71.25	0.67
		SS	13	124-146	133	71.25	0.18
	Eightmile	LSK	5	-	-	24.0	0.21
		SS	11	120-566	292	24.0	0.46
	Judd T17N, R13W, S12, 13	DV	17	215-515	367	73.75	0.23
		GR	2	338-374	356	73.75	0.03
		LSK	26	-	-	73.75	0.35
		RT	2	370-392	381	73.75	0.03
		RWF	16	222-410	322	73.75	0.22
		SS	2	262-322	392	73.75	0.03
	Lockwood T19N, R7W, S8	LSK	16	-	-	24.0	0.67
		RT	10	200-510	375	24.0	0.42
		RWF	7	210-385	314	24.0	0.29
		SS	17	115-210	127	24.0	0.71
	Sevenmile T20N, R11W, S14	LSK	1	-	-	18.0	0.06
		SS	2	278-370	324	18.0	0.11
	Un-Named #6815 T10N, R11W, S7	None	-	-	-	46.0	0.00
	Un-Named #6694 T19N, R7W, S22	RT	15	172-412	278	28.0	0.54
		SS	14	104-220	129	28.0	0.50
		RWF	63	185-436	291	28.0	2.25

### Stream Population Sampling - Western Susitna Area

Three streams, Coal Creek, the Talachulitna River, and its tributary, Talachulitna Creek, were test fished by hook and line to determine species composition and size of fish which may normally be taken in a sport catch. The limited fish population data collected is shown in Table 2. Coal Creek contained an excellent sport fishery for Dolly Varden char, Arctic grayling, Thymallus arcticus, and rainbow trout, as does the Talachulitna River. In both streams, chinook salmon, Oncorhynchus tshawytscha, were observed at the time of survey. Talachulitna Creek produced only rainbow trout and Arctic grayling during a short fishing period.

TABLE 2. Fish Species and Size Composition of Hook and Line Catches From Three West Susitna Streams, 1973.

<u>Stream and Location</u>	<u>Date</u>	<u>Species</u>	<u>Number Fish</u>	<u>Length (mm)</u> <u>Range</u>	<u>Mean</u>	<u>Angler/Hours</u>
Coal Creek T16N, R13W, S17	7/10/73	DV-Caught	8	255-520	376	2
		GR-Caught	9	308-400	368	
		RT-Caught	3	250-450	351	
		KS-Observed				
Talachulitna Creek T17N, R12W, S16	6/21/73	GR-Caught	2	355-385	370	1
		RT-Caught	1	-	410	
Talachulitna River T19N, R12W, S34	7/02/73	DV-Caught	1	-	350	2
		GR-Caught	8	190-382	309	
		RT-Caught	11	260-436	346	
		KS-Observed				

### Test Netting - Anchorage Area Lakes

The 19 lakes in the Anchorage area, test netted in 1973, are shown in Table 3 with total length, weight, and fish species present in each. All of the lakes shown except Campbell Lake were stocked with game fish in 1973 and are part of the Sport Fish Division stocking programs and/or have management potential.

Campbell Lake, an impoundment of the waters of Campbell Creek near its mouth on Turnagain Arm, was test netted to determine established fish species. Dolly Varden char, although present in the stream, were not taken in the lake during netting; coho salmon were the only fish captured. Coho salmon apparently use the lake as a rearing area because nine juvenile salmon were taken (Table 3).

The presence of four adult coho may indicate a late run to the Campbell Creek system and possible spawning under an ice cover in the stream. Three adult males taken were in ripened condition, and an adipose clip on one of these fish indicated it was a stray from the 1972 coho salmon plant of hatchery

TABLE 3. Post Netting Results, Anchorage Area Lakes, 1973.

Lake	Date	Species	Number of fish	Length (mm)		Weight (g)		Net-Hours	Fish/ Net-Hours
				Range	Mean	Range	Mean		
Beach	11/ 8/73	RT	61	215-404	356	258-750	511	46.0	1.33
Campbell	11/27/73	SS adults	4	700-770	732	3,178-5,164	3,901	25.0	0.16
		SS juveniles	9	114-132	125	10-19	15		0.36
Campbell Pt.	11/20/73	--	0	-	-	-	-	45.0	0.00
Connors	6/20/73	BF	2	165-190	177	44-62	53	10.5	0.19
Clunie	11/ 8/73	RT	13	272-453	334	180-1,002	453	45.0	0.29
DeLong	11/20/73	RT	5	278-367	331	232-616	412	43.0	0.12
Fish	11/23/73	--	0	-	-	-	-	48.0	0.00
Green	11/ 7/73	RT	9	242-340	282	127-446	239	34.5	0.26
Gwen	11/21/73	RT	22	363-445	404	717-1,498	1,000	19.75	1.11
Hillberg	11/ 7/73	RT	2	390-423	406	666-744	905	35.5	0.06
Jewell	11/ 6/73	RT	2	273-285	279	183-198	190	18.5	0.11
Lower Fire	8/10/73	RT	8	265-295	276	178-290	217	69.0	0.12
		BF	3	160-175	167	40-50	43	69.0	0.07
		RS	4	325-371	464	360-540	432	69.0	0.09
		SS	5	159-195	174	40-72	50	69.0	0.11
Mirror	8/10/73	RT	12	200-434	291	74-916	307	24.0	0.50
Sand	11/27/73	--	0	-	-	-	-		
Six-Mile	7/27/73	SS	7	124-389	216	15-663	162	48.0	0.15
Thompson	11/21/73	RT	1	-	319	-	352	39.0	0.03
Triangle	11/23/73	--	0	-	-	-	-	49.25	0.00
Upper Fire	6/20/73	RT	1	-	210	-	74	11.5	0.09
		SS	3	184-200	193	44-46	45	11.5	0.26

reared fish in Ship Creek. The single female was a bright fish whose egg development indicated spawning would necessarily take place under the ice cover of the stream and several weeks away.

The presence of late maturing and spawning salmon in the Campbell Creek system, and rearing juveniles in the lake indicates the practices of dredging in the lake as permitted in the late winter of 1972 and 1973, and utility line crossings during the period of ice cover on the stream, should be more closely monitored. Protection of the fishery resources of Campbell Creek can only add to its recreational, aesthetic, and educational value to the community as urbanization of streamside areas continues.

#### Water Chemistry Surveys

Data on water chemistry parameters of dissolved oxygen, pH, total hardness, total alkalinity, are shown in Table 4 for western Susitna River lakes, and Anchorage area lakes in Table 5.

Of the nine lakes in the western Susitna River area which were treated for water quality, none demonstrated any unusual departures from the water quality characteristics common to lakes of the region. On the basis of the total alkalinity measurements, all the lakes can be characterized as being of low to moderate biological productivity.

With the exception of DeLong Lake, the data in Table 5 was collected during the month of March in 1973 to evaluate winter dissolved oxygen levels. The data shown indicates none of the lakes tested would have had winterkill of fish populations.

#### Morphometric Surveys of Lakes

Morphometric surveys were made on Lower Fire, Mirror, Sixmile, and DeLong Lakes prior to planned treatment with 2.5% rotenone emulsion (Pronox-fish). Data on the surface area (acres), volume (acre feet), average depth (feet) are shown in Table 6. Detailed maps constructed following the surveys are on file in the Anchorage area office.

Surveys of the basins of Judd Lake and Congahbuna Lake in the western Susitna area were also made in 1973, but area, volume, and average depth information were not calculated by report time. However, maps showing the lake configurations and bathymetry are on file.

#### Lake Rehabilitation

Four lakes in the Anchorage area were treated in October with 2.5% emulsified rotenone (Pronofish) during 1973. Fire Lake, 62.9 surface acres; Otter Lake, 98.9 surface acres; and Sixmile Lake, 145.7 surface acres, were treated at a rate of 1.25 ppm of rotenone, and Mirror Lake, 68.2 surface acres, was treated with a concentration of 1.0 ppm rotenone.



TABLE 4. Water Chemistry Characteristics of Surface Waters, Secchi Depth, and Thermocline in West Susitna Lakes, 1973.

<u>Lake Name</u>	<u>Date</u>	<u>Temperature (°F)</u>	<u>D.O. (mg/e)</u>	<u>pH</u>	<u>Total Alkalinity (mg/l as CaCO<sub>3</sub>)</u>	<u>Total Hardness (mg/l)</u>	<u>Secchi Depth (m)</u>	<u>Water Color</u>	<u>Thermocline Depth (m)</u>
Congahbuna	6/13/73	60°	10.5	7.0	34.0	-	2.0	brown	4.0
Coal Creek	7/12/73	64°	10.0	7.0	34.0	34.0	5.4	clear brown	5.0
Eight-Mile	8/14/73	57°	-	7.0	68.0	103.0	-	brown	-
Judd	6/21/73	47.5°	12.0	7.0	34.0	34.0	-	clear green	-
Lockwood	7/24/73	69.0°	9.0	8.0	68.0	68.0	3.0	brown	3.0
Seven-Mile	8/13/73	57.0°	9.0	7.0	34.0	51.0	3.2	brown	6.0
Un-Named #6815	7/ 3/73	64.0°	11.0	7.0	34.0	34.0	4.2	brown	3.25
Un-Named #6694	7/25/73	70.0°	-	8.0	68.0	51.0	-	brown	-

TABLE 5. Water Chemistry in Anchorage Area Lakes, 1973-73.

<u>Lake Name</u>	<u>Date</u>	<u>D.O. Range</u> (mg/l)	<u>pH Range</u>	<u>Total Alkalinity</u> <u>Range</u> (mg/l CaCo <sub>3</sub> )	<u>Total Hardness</u> <u>Range</u> (mg/l)
Campbell Point	3/ 2/73	8.5-4.0	7.0-6.5	51-34	-
Connors	3/ 2/73	3.0-0.5	7.0	154-68	-
DeLong	7/ 4/73	10.0-9.0	7.0	34	34
Fish	3/13/73	8.5-5.0	6.5	34-17	34-17
Green	3/21/73	6.0-0.5	7.0	120-68	120-85
Hillberg	3/13/73	4.0-0.0	7.0	68-34	85-68
Otter	3/ 6/73	9.0-0.0	8.5-7.5	273-154	-
Six-Mile	3/21/73	5.0-0.0	8.5-8.0	239-205	273-222
Thompson	3/ 6/73	10.0-1.0	6.5	51-34	34-17
Triangle	3/21/73	9.0-1.5	7.0-6.5	34-17	34-17

TABLE 6. Surface Area, Volume, and Average Depth of Anchorage Area Lakes Volumetrically Surveyed in 1973.

<u>Lake</u>	<u>Surface Area (Acres)</u>	<u>Volume (Acre-Ft.)</u>	<u>Average Depth (Ft.)</u>
DeLong	21.9	317.0	14.5
Lower Fire	62.9	589.5	9.4
Mirror	68.2	367.9	5.4
Sixmile			
Lower Lake	131.2	807.0	6.2
Upper Lake	14.5	24.7	1.7

The comparatively high dosages of rotenone used at Otter and Sixmile lakes were to provide a more extended toxicity period due to some outflow and extensive swampy area. The extended toxicities in the lake, (high dosage rate, cool water temperature), was intended to minimize or preclude survival of threespine stickleback. Freezing ice conditions in lake water forced stickleback into toxic waters. Lower Fire Lake was treated at the 1.25 ppm concentration since the toxicity of rotenone on the target species for eradication, Alaska blackfish, is essentially unknown and a complete kill was desired.

#### Eulachon Investigations

Investigation of the Twentymile River eulachon populations and the dip net sport fishery continued for the second consecutive year. The main channel of Twentymile River was ice free by April 27, 1973, or about 17 days earlier than the May 14, 1972 date (Trent, 1972). First recorded entrance of eulachon into Twentymile River was on May 16, 1973, or four days earlier than in 1972 when smelt appeared on May 20. The peak of the dip net fishery in 1973 occurred on May 27, as compared to May 28 in 1972. The run of eulachon spanned a period of 28 days between May 14 and June 12, 1973. A 16-day run occurred in 1972 between May 20 and June 4.

In 1972, recreational fishermen dip-netted an estimated 1,259 man-hours to harvest 15,870 fish (Trent, 1972). The stronger and more extended run of smelt in 1973 resulted in an estimated harvest of 72,950 fish in 3,514 angler-hours of effort from May 16 to June 12, 1973. The mean success rate of anglers in 1973 was 20.76 fish per hour as compared to the 9.02 fish per hour figure in 1972.

Smelt in the 1973 run into Twentymile River were slightly larger than in 1972 (Trent, 1972). Mean length and weight of smelt in the 1973 population as collected from 345 fish between May 16 through June 9, 1973, was 233 mm and

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Date	Length Range (mm)		Mean Total Length (mm)		Weight Range (g)		Mean Weight (g)		Sex Ratio
	Male	Female	Male	Female	Male	Female	Male	Female	Male/Female
5/16	212-253	213-255	236	237	47-96	50-102	74	78	2.1:1
5/17	216-260	215-255	235	233	60-104	58-104	76	76	1.5:1
5/20	200-245	210-250	231	236	50-92	50-96	75	80	3.6:1
5/23	219-250	235-242	236	238	55-86	76-86	70	81	1.9:1
5/26	226-255	207-252	238	232	60-90	38-94	70	70	0.7:1
5/27	210-246	210-240	232	226	48-80	44-78	67	64	1.9:1
5/28	217-248	210-243	235	233	64-96	60-94	81	77	0.9:1
6/ 3	210-252	231-243	231	230	44-90	64-89	65	77	29:1
6/ 9	223-253	---	239	---	56-86	---	78	--	13:1
Season	200-260	207-255	235	233	47-104	38-104	71	74	2:1

n Males = 230    Females = 115

74 g respectively. In 1972, the mean length was 227 mm and 72 g. Sex ratio (male/female) of the smelt population from random samples of dip net and gill net catches was 2:1 and 2.8:1 in 1973 and 1972, respectively.

The mean length (mm), weight (g), and sex ratio of smelt in the 1973 samples are shown by sex and date of collection in Table 7.

Eulachon from Twentymile River were aged from otoliths and scales taken in 1973. Ages determined from scales collected in 1972 indicated all fish were three years of age. However, possible resorption and regrowth patterns noted in 1973 on some scales indicated aging by otoliths would be required to determine if a portion of the smelt population survived and spawned a second time at age four. As a result of the otolith and scale age comparisons, it was determined that about 7% of the male and 12% of the female smelt were four years of age and second time spawners.

#### Sport Fish Stocking and Lake Management

Fourteen lakes and one stream, Chester Creek, in the Anchorage management area, were planted with a total of 83,559 rainbow trout during 1973. Grayling were stocked in one lake. The lakes stocked, the species planted, their size and number of fish released are shown in Table 8.

TABLE 8. Fish Stocking in Anchorage Area Lakes and Streams, 1973.

<u>Lake/Stream Name</u>	<u>Date</u>	<u>Species Stocked</u>	<u>Number Stocked</u>	<u>Size (Fish/Lb.)</u>
Beacon	5/30/73	RT	5,100	4.9
Campbell Point	5/29/73	RT	5,000	4.7
Chester Creek	5/29/73	RT	1,000	4.8
Commons	6/15/73	GR	20,000	fry
Clarke	5/16-17	RT	12,900	5.3
Crabong	5/29/73	RT	5,000	4.7
Elmendorf				
Cooling Pond	7/06/73	RT	343	catchable
Dr. Richardson				
Derby Pond	6/ 7	RT	3,100	3.5
Green	5/21/73	RT	5,100	5.5
	6/21	RT	1,045	catchable
	7/17	RT	1,711	catchable
Gwen	5/16	RT	3,160	5.3
Hercules	5/25	RT	1,000	5.2
Jewell	6/29-30	RT	16,300	3.2
Lower Fire	5/29	RT	2,800	4.7
Mirror	5/30	RT	5,000	4.9
Minor	5/16	RT	10,000	5.3
Thompson	5/17	RT	5,000	5.5

## Upper Cook Inlet - West Side Susitna River

### Chinook Salmon Escapement:

Most west side tributaries of the Susitna River averaged higher counts in 1973 than in 1972, while some streams contained fewer chinook salmon in 1973. In those streams where direct comparisons can be drawn between the years 1972 and 1973, there were 4,937 chinook salmon counted in 1973, and 3,838 chinook salmon in 1972.

Two basic methods, aerial and ground surveys, were utilized to obtain distribution, numbers, and time of arrival of adult salmon in clear water streams; other methods of enumeration included counting towers and boats. Since it is not economically feasible to have a weir or tower on each stream, aerial and ground counts were the only means of obtaining information for most streams in the area.

Generally, aerial surveys were accomplished by light, fixed-wing aircraft capable of following winding stream courses. During the 1973 season a small helicopter was included.

A total of 5,086 adult chinook salmon were observed in 21 west side streams. These figures do not represent the actual total escapement into these streams, but are an index as to the numbers of fish in that particular stream at the time of survey. A summary of chinook salmon escapement counts for streams west of the Susitna River for 1972 and 1973 is shown in Table 9.

In addition to the west side Susitna streams, four creeks located in the Anchorage area were surveyed for spawning populations of chinook salmon (Table 10).

### Evaluation of Enumeration Techniques

Comparative counts were made on specified clear water streams having a known population of chinook salmon to check the variability and reliability of enumeration techniques.

Ground, fixed wing, helicopter and tower counts, were conducted and compared on the Deshka River, Alexander Creek, Lake Creek, and the Talachulitna River.

Comparative counts were attempted on the same day, to avoid changes in fish movements, weather, availability of aircraft and personnel. In several instances, counts were necessarily made several days apart, because of the large area involved. The results of these comparisons are presented in Table 11.

TABLE 9. Chinook Salmon Survey Counts West Side Susitna River, 1972-1973.

<u>Stream</u>	<u>1972</u>	<u>Type Survey</u>	<u>1973</u>	<u>Type Survey</u>
Deshka River System	1,780	Ground	2,381	Tower*
Alexander Creek System	202	Aerial/Ground	875	Ground
Lake Creek System	920	Aerial	761	Aerial/Ground
Talachulitna System	405	Tower	333	Tower
Chuit River	417	Aerial	149	Aerial
Theodore Creek	79	Aerial	205	Aerial
Lewis River	7	Aerial	173	Aerial
Coal Creek	20	Aerial	31	Aerial
Canyon Creek	8	Aerial	29	Aerial
Straight Creek			5	Aerial
Olsen Creek			2	Aerial
Donkey Creek			25	Aerial
Clearwater Creek			6	Aerial
Peters Creek			59	Ground
Squaw Creek			10	Aerial
Indian Creek			5	Aerial
Nakochna River			12	Aerial
Un-Named Creek #1			3	Aerial
Un-Named Creek #2			3	Aerial
Un-Named Creek #3			8	Aerial
Un-Named Creek #4			11	Aerial
Total	3,838		5,086	

\* An additional 858 jacks were counted. Usually chinook salmon survey counts compared from year to year are confined to adult escapement. Chinook salmon under 20 inches in length are difficult to observe during aerial and ground surveys. During 1973 counts on these small fish were possible due to excellent visibility over the tower panels.

TABLE 10. Chinook Salmon Survey Counts - Anchorage Area Streams, 1972-1973.

<u>Stream</u>	<u>1972</u>	<u>Type Survey</u>	<u>1973</u>	<u>Type Survey</u>
Ship Creek	121	Ladder/Ground	165	Ladder/Ground
Campbell Creek	47	Ground	201	Ground
Bird Creek			2	Ground
S.F. Eagle River			61	Ground
Total	168		429	

TABLE 11. Comparative Chinook Salmon Escapement Counts: Fixed Wing Aircraft, Helicopter and Ground, 1973.

<u>Stream</u>	<u>Bell 47 Helicopter</u>	<u>PA 18 Supercub</u>	<u>Ground</u>
Alexander Creek	797	231	835
Sunflower Creek	154	17	48
Camp Creek	72	25	69
Lake Creek	414	90	
Chuit River	<u>149</u>	<u>24</u>	<u>          </u>
Total	1,586	387	952

Chinook Salmon Counts, Not On the Same Day\* With Different Observers

Moose Creek	316	98	320
Broto Creek	1,076		1,137
Salachulitna River	100	6	131
Beshka River	589		263
Coal Creek	31	15	
Straight Creek	<u>5</u>	<u>0</u>	<u>          </u>
Total	2,117	119	1,851

\* Usually a difference of 3-4 days.

Generally speaking, helicopter and ground counts were comparable, but there were significant differences between supercub (PA 18) and helicopter/ground counts. Five streams were chosen to compare fixed wing counts with helicopter and ground counts. The same areas on these streams were surveyed the same day by each method. The effectiveness of fixed winged aircraft ranged from a low of 11% in Sunflower Creek to a high of 36% in Camp Creek (Table 12).

TABLE 12. Relative Effectiveness of Chinook Salmon Aerial and Ground Surveys on West Side Susitna River Tributaries, 1973.

<u>Stream</u>	<u>% Success of Fixed Wing vs. Helicopter Surveys</u>	<u>% Success of Fixed Wing vs. Ground Surveys</u>
Alexander Creek	231/797 = 29%	231/835 = 28%
Sunflower Creek	17/154 = 11%	17/48 = 35%
Camp Creek	25/72 = 35%	25/69 = 36%
Lake Creek	90/414 = 22%	
Chuit River	24/149 = 16%	



It is apparent that variability lies in the difference in the experience and abilities of the various pilots and observers used.

Tower counts on the Deshka River - 2,381 adults and the Talachulitna River - 333, were higher than any other enumeration technique; however, it is not economically feasible to establish a tower on each stream, so escapement counts by aerial means will continue as the only source of information in many areas.

The helicopter has several distinct advantages over fixed wing aircraft. Most important is the slower speed and maneuver capabilities on winding streams. The visibility is considerably better in a helicopter than the supercub. As a result of these comparisons it is recommended that the use of a helicopter be included in future stream survey counts.

#### LITERATURE CITED

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